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ABSTRACT

A music reading program was successful in teaching note reading in a nearly errorless fashion to one educable mentally handicapped and two learning-disabled piano students (aged 6-13). The program was based on principles extracted from the psychological and educational research literature and included the need to: (1) use symbols that catch children's attention; (2) match content to readiness level; (3) match methods to cognitive style; (4) adapt to uneven rates of learning; (5) match materials to gestalt scanning preferences; (6) match methods to vertical discrimination preferences; (7) incorporate motor reinforcement activities; (8) isolate hands and coordinate mirror movements; (9) plan for inhibitory motor movements; (10) distribute practice into short sessions at frequent intervals; (11) match timing to information processing speed; (12) match repetitions to students' practice needs; (13) avoid perceptual overloading; (14) teach self-verbalization as a learning strategy; (15) enhance motivation by use of individualized incentives; and (16) involve parents. The paper stresses the importance of encouraging instrumental instruction for handicapped children, in order to provide them with opportunities for self-expression and self-satisfaction, to avoid social isolation, and for integration with their culture's aesthetic experiences. (JDD)

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Adapting Piano Instruction to the Needs of Children With Learning Disabilities: Merging Research & Intervention

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Piano Instruction for the Student with Special Educational Needs: A Position Paper and Preliminary Study

Abstract

Although musical experiences repeatedly have been reported to facilitate developmentally disabled students' progress socially, emotionally, and academically, these students are seldom offered more advanced levels of instrumental instruction. This occurs in part because when it is time to transition from aural to note reading methods, immaturities in these children's information processing abilities make them unready to profit from traditional instructional materials and methods. This article describes a music reading program developed on the basis of 16 principles extracted from the psychological and educational research literature. These materials and teaching strategies were successful in teaching note reading in a nearly errorless fashion to one educable mentally handicapped and two learning disabled piano students. This paper suggests that it is important for music educators to encourage instrumental instruction for handicapped children, so as to give them the same opportunities for self-expression and self-satisfaction offered to typical learners. By widening our horizons, we in turn may expand these youngsters' opportunities to use their leisure time constructively, avoid social isolation, and integrate with our culture's aesthetic experiences.

Piano Instruction for the Student with Special Educational Needs: A Position Paper and Preliminary Study

Music therapy repeatedly has been found to facilitate the developmentally disabled student's progress socially, emotionally, and academically (Atkins & Donovan, 1984; Barmann & Croyle-Barmann, 1980; Harvey, 1980; Holloway, 1980; Miller, 1977; Schuster & Vincent, 1980; Wilson, 1976; Wolfe, 1980). Furthermore, it is reported that keyboard learning has enhanced knowledge, attitude, creativity, and self concept of ability regarding music beyond that gained from traditional school music classes (Wig & Boyle, 1982). Nevertheless, due to handicapped youngsters' lower initial musical ability (Atterbury, 1983; Gilbert, 1983; McLeish & Higg, 1982) and likely difficulty learning to read musical notation, they are seldom given an opportunity for more advanced forms of instrumental instruction. Unfortunately, this decision denies these children an important self-concept building and "normalizing" experience, as well as the ability to share in the artistic experience of their culture.

* The author wishes to acknowledge Sheila Mofson's creativity in adapting the theoretical principles discussed in this paper to a novel set of music reading materials and then field-testing this material with three developmentally disabled students. Her aid in translating theory into music education practice was invaluable. Ms. Mofson's permission to reproduce two pages from her program, Shapes and Sounds: A Unique Approach to Reading Piano Music (1985), is appreciated.

Other factors cited for limiting the handicapped child's exposure to instrumental instruction is lack of teacher preparedness, confusion as to methods for teaching the arts to the handicapped, and negative attitudes toward the value of such efforts (Appell, 1980). Given our current body of research in child development, special education, neuropsychology, and music education, however, this need not be the case. This literature suggests numerous ways in which developmentally delayed youngsters can be successfully instructed to read musical notation. When these strategies are applied to music instruction, they facilitate the child's ability to "crack the code" in reading music, much as they might facilitate cracking the code in reading. In fact, several studies have found that the analytic, language-based, symbolic coding process required to learn the alphabetic and musical symbol systems are neuropsychologically similar (Karma, 1982; Oepen & Berthold, 1983; McMahon, 1982; Segalowski, Bebout, & Lederman, 1979).

In order to devise materials and methods for teaching note reading to developmentally disabled children, the experimental literature in developmental psychology, neuropsychology, special education, and music education was searched and instructional ideas generated. This resulted in a set of specific directions for teachers to follow when individualizing strategies for teaching musical notation to developmentally disabled children. These instructions and the principles from which they were derived are elaborated below.

1. Use Symbols that Catch Children's Attention.

Perhaps the most common characteristic of children with learning

difficulties is immature attending ability (Denckla, 1979; Douglas, 1974, 1976; Keogh & Margolis, 1976; Samuels, 1973; Samuels & Anderson, 1973; Tarver & Hallahan, 1974). While attention is easily caught, these children experience difficulty focusing in on relevant stimuli and sustaining this attention (Dykman & colleagues, 1970, 1971; Dainer & colleagues, 1981; Fuller, 1978; Grunewald-Zuberbier, Grunewald, & Rasche, 1975; Deutsch, 1967; Morrison, Giordani, & Nagy, 1977; Sheer, 1976). As these students often learn much like younger children, incorporating students' visual discrimination preferences for color or shape can help maintain attention to tasks' critical distinctive features (Brian & Goodenough, 1929; Gaines, Suchman, & Trabasso, 1966; Melkman, Koriat, & Pardo, 1976; Odom & Corbin, 1973; Suchman & Trabasso, 1966).

Therefore, rather than using traditional musical notes on sheet music, the teacher should discover whether the child's preference is for shape or color and then substitute this for the notes. If each note is a different shape or color, the notes will be discriminated from one another with ease. They will sustain a child's attention and the association of each shape or color with its position on the staff will ease the transition to using regular musical notation at some later time. When in doubt, shape should be chosen as the stimulus because it is the visual preference to which older preschoolers eventually return. Figure 1 illustrates how shapes were used in teaching the three developmentally disabled students in this pilot project to read music. Figure 2 demonstrates how the shapes were gradually faded. Line notes were faded first so that "spacers" remained to aid discrimination.

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insert Figures 1 and 2 here

Additional means to attract a child's attention to relevant features, thereby increasing chances for learning, include the following: working from three-dimensional materials in addition to or instead of the two-dimensional sheet music (flannel board notes, magnetic board notes), using extensive verbal explanations that point out distinctive features, accentuating task-relevant features (e.g. drawing an oversized staff), handling relevant objects (e.g. matching stickers of notes to others placed on the keyboard or the student's fingers), requiring recognition before recall (e.g. teacher plays parts of pieces and child comments whether correct or incorrect; child finds matching sticker on keyboard before being expected to read and play the note independently) (Koenigsberg, 1973; Pick, Frankel, & Hess, 1975). Clearly, multiple strategies geared toward a single concept best engage students' attention and encourage learning.

Finally, teachers can improve students' accuracy when they carefully match their own behaviors to students' preferred learning strategies. Coop & Sigel (1971), for example, point out that the reflective teacher's slow-paced, detailed approach may bore the impulsive student. Therefore, the teacher needs to be ready to change activities frequently, perk interest by presenting exciting stories relevant to the pieces, and maintain an enthusiastic, bouncy air.

2. Match Content to Readiness Level.

Don't teach too much, too soon, too fast. Instead, gear learning tasks to what children are ready to master, and not to their age or grade expectations. When children are taught what they are ready to learn, the need for very special teaching techniques is reduced (Kinsbourne & Caplan, 1979). If the child is pushed beyond his or her readiness level, error rate is high, bad habits are learned, a dislike for the task is developed, task avoidance increases, and much teacher time in later undoing the faulty learning is necessitated (Ames, 1977).

Therefore, if a child is continuing to make too many errors, instruct the student to review only those measures on which success meets a satisfactory criterion. If the material remains too difficult, have the child practice an easier piece instead, while also increasing readiness for the difficult piece by using multisensory activity oriented exercises that simulate the same concept (see Teaching Principle 7). For severely delayed children with no prior training and little musical exposure, teach loud/soft discrimination first, followed by pitch discrimination, and then rhythm. This is the order in which ability to discriminate, compare, recall, and discuss observations develops for typical learners (Buckton, 1982; Webster & Zimmerman, 1983).

3. Match Methods to Cognitive Style.

Every child's temperament reflects a preferred way of looking at and interacting with the world (Keogh, 1977). Although adaptive in

many cases, at times this manner of perceiving, remembering and problem-solving hinders success (Ramirez & Castaneda, 1974; Zelnicker & Jeffrey, 1976). Attending to cognitive style is essential as students' learning can be enhanced when task demands are adapted to their conceptual styles, when they are taught better learning strategies, or when through maturation they develop more appropriate strategies (Ross, 1976; Torgesen, 1980). Therefore, for the impulsive child who tends to be an underfocused, premature decision maker, and whose preference tends toward globally scanning wholes rather than analyzing details, techniques that draw attention to the music's gestalt, and only later require attention to the sequence of individual notes, may be helpful (Block, Block, & Harrington, 1974; Zelnicker & Jeffrey, 1976): e.g. play the piece for the child; have the child listen repeatedly to a continuous tape of the piece; have the child drawn and trace the piece's configuration, how it goes up and down on the scale without regard for the lines of the staff; recognize the pattern of ups and downs on flash cards. Due to the distractibility caused by irrelevant stimuli, pages of music need to be as simple as possible, uncluttered by material that will draw attention moreso than the important features (Kagan & colleagues, 1964; Keogh, 1973; Keogh & Donlon, 1972). Consequently, pictures or lyrics created by children to accompany music should appear on separate pieces of paper. Teachers' markings should be kept to a minimum and fingering notation should be eliminated where possible, so that attention to the notes is maximized (Lamman & Bakker, in Bakker and deWit, 1977; Samuels, 1967). In this way the tendency to focus on irrelevant stimuli will be reduced and the ability to organize essential perceptual inputs enhanced.

Children who have difficulty directing their own learning and benfitting from discovery approaches will require the same concept to be explained by means of several complementary activities (Hunt, 1974; Hunt & colleagues, 1974; Scott & Sigel, 1965, in Coop & Sigel, 1971). The point of these exercises must be explicitly stated and restated. For example, when using listening exercises, tracing the pattern, or even walking stairs to draw attention to the up-down pitch changes within a piece, the teacher needs to continually explain the relevance of the activity.

Many students approach music instruction in an inactive, inefficient, disorganized manner, having little awareness that they are to put energy into learning and that memory is possible. These children's selective attention and recall can be enhanced by encouraging the use of verbal mediation, visual imagery, stopping and thinking before responding, preplanning task approaches, organizing time, or searching material for details (Abikoff, 1979; Egeland, 1974; Flavell, 1971; Gibson, 1973; Hagen, 1971; Heider, 1971, in Torgesen, 1977a; Meichenbaium, 1976, 1977; Norman, 1969; Orbach, 1977; Ridberg, Parke, & Hetherington, 1971; Torgesen, 1977abc, 1980). For example, children may find that writing their own lyrics or drawing their own illustrations to accompany the music is helpful. Verbal self-instruction to stop and visually scan a piece, visualize playing its melody or imagine how the piece looks "in one's head," or imagine one's fingers playing the piece before actually attempting to play it may be helpful. Modeling, by resting the student's fingers on top of the teacher's while the teacher plays the piece with exaggerated finger movements, is helpful, as is the student directing the teacher's finger movements.

4. Adapt to Uneven Rates of Learning.

Often a student will be making very rapid progress for a period of time and then suddenly the progress slows greatly or is arrested as a new challenge to a child's cognitive and information processing maturity is posed (Kinsbourne & Caplan, 1979). It may be time to either give the child a brief vacation from piano, or to "go back to basics" and review even the most elementary principles. Either strategy aids consolidation of known information and permits forgetting of mislearning so as to facilitate new learning and give time for maturation to take its course (Denckla & Heilman, 1979; Kinsbourne, 1973; Zangwill, 1960). A corresponding event within the reader's experience may be the "block" to further learning of a foreign language at midsemester. The one week break, followed by a thorough review because "I've forgotten everything I know," consolidated the knowledge and prepared you to integrate the more difficult learning expectations.

5. Match Materials to Gestalt Scanning Preferences.

Younger children's attention is drawn to overall configurations, with attention to internal elements developing later (Hamilton & Vernon, 1976). Similarly, young children tend to perceive melodies holistically rather than analytically (Walker, 1983). Assuming that developmentally disabled children may have a tendency to globally attend to the overall configuration of notes on a scale, they will have a difficult time making the fine discriminations necessary to perceive adjacent notes. If a color or shape coding system is not used to aid discrimination of adjacent notes, then only notes on lines should be

taught at the beginning. This skipping of spaces makes attention to configuration easier. As larger intervals between notes are easier for elementary school students to auditorally discriminate than adjacent intervals, this aural feedback will serve as a further reinforcer for note learning (Billingsley & Rotenberg, 1982; Buckton, 1982). When these discriminations are well learned, the child will be prepared to engage in the internal discrimination necessary to accurately perceive the positions of space notes and interelate them with line notes.

6. Match Methods to Vertical Discrimination Preferences.

Vertical discriminations are easier for young children to deal with than horizontal discriminations (Corballis & Zolik, 1977; Hendrickson & Muehl, 1962; Hock & Hilton, 1979; Rudel & Teuber, 1963). Yet, reading music requires a vertical discrimination that is then translated into a horizontal dimension when played on the piano. When up means right and down means left, the probability for confusion is great.

Children might be asked to stand with their left sides to the piano holding the sheet music horizontally before them, parallel with the keys. The teacher would demonstrate how the horizontal keyboard corresponds with the sequences of written notes. Children might color each note and place a matching sticker on the corresponding piano key. They also might walk along a keyboard drawn on paper and taped to the floor, while glancing at the sheet music. When the teacher then directs the children to face the piano, it should make more sense to

left.

7. Incorporate Motor Reinforcement Activities.

Motor movements and modeling of teachers' performances help to direct learning by calling a child's attention to salient stimuli that he or she otherwise may have perceived but attributed little meaning to (Cullinan, Kauffman, & LaFleur, 1975; Goodnow, 1971; Zaporozhets, 1965). Although piano playing is certainly a motor task, for a clear association to be drawn between the musical notation and the child's finger movements, additional motor reinforcement activities often are necessary. For example, once having chosen shape or color as the salient stimulus for notes, the child might apply stickers of the same shape or color to the corresponding piano keys and fingers. That is, if middle C on the sheet music is a heart shape, then a heart sticker would be placed onto the piano's middle C key and the child's thumbnail. If color is the salient cue, matching nail polish is likely to attract a great deal of attention. Additional means for using motor reinforcement to drawn attention to relevant attributes include imitating the sheet music's staff and notes with flannel board or magnetic board activities, tracing the notes, coloring the notes, baking "staff" cookies on which position of chocolate chip notes vary, creating a dance to the music, drumming the rhythm, drawing a picture to accompany the piece, writing and singing lyrics to the piece, walking up and down stairs with corresponding musical notations (e.g. if the sheet music skips over a "space" note from E to G, the child jumps over a step).

8. Isolate Hands and Coordinate Mirror Movements.

Music education studies find that children with learning difficulties are delayed in ability to direct finger movements when compared with their typical peers (Gilbert, 1983). When trying to activate just the right hand, there may be overflow of activity to the same fingers of the left hand and vice versa (Smith, 1983). In addition, we know that neurologically it is difficult for young children to coordinate the fine finger movements of two hands at once. When playing together, movement of the same fingers on both hands may be easier than both hands moving in the same direction (left hand's 5th finger and right hand's thumb). This is related to the child's hands moving away from and towards the body's midline at the same time, and the same motor areas in each cerebral hemisphere being activated at once.

Typically, students are instructed to play the right hand alone for a period of time. When the left hand is introduced, it may be wise to eliminate the right hand for some time. If the child cannot coordinate different finger movements on the keyboard, songs might be played in mirror fashion so that the same fingers on the two hands are playing simultaneously. On the other hand, playing both hands in the same direciton might be the method of choice if the student prefers to use the melody as an aid for recall.

9. Plan for Inhibitory Motor Movements.

Neurologically, it is far more difficult to inhibit a motor

response than to continue it (Ekel, 1974). Therefore, rests in music should be delayed until later in the instructional sequence. It is more difficult for the child to be playing several notes, and then direct the hand to stop, than to continue playing.

10. Distribute Rather than Mass Practice.

Distributed practice, short sessions at frequent intervals, produces greater retention than massed practice, long sessions at less frequent intervals. Therefore, piano lessons should be kept short, with frequent changes in activities. Home practice should occur daily, but only for 10 - 15 minutes at the most initially. Not all pieces, or all sections of pieces, need to be practiced daily; every other day intervals may be equally beneficial. Repetitions of several measures of a piece should be halted at the point before performance deterioration generally sets in.

11. Matching Timing to Information Processing Speed.

Some children with learning difficulties require a longer period of time between two visual or auditory stimuli to process them (Lovegrove, Billing, & Slaghius, 1978; O'Neill & Stanley, 1976; Tallal & Percy, 1978). Performance improves when the interval between stimuli becomes longer (usually over 2 seconds) or the stimuli themselves last longer. Similarly, fast tempos tend to distract students, increase errors on motor tasks, and reduce visual attention and information acquisition (Klein, 1981; Wakshlag, Reitz, & Zillman,

1982). As slow tempos are the music of choice, begin instruction with whole notes and half notes. Count slowly so that the interval between quarter notes will be extended. Increase the rate as mastery is consistently demonstrated at a slower pace. Furthermore, perception of musical rhythm may be aided by instruction on the duration of notes (Longuet-Higgins, Christopher, & Christopher, 1982).

12. Match Repetitions to Students' Practice Needs.

It is essential to discover the degree of overlearning required by each student. While one child might need four repetitions to "make perfect," another child might require 15. This evaluation process also necessitates examination of optimum intervals for review and which types of review will best speed up the overlearning process for a given pupil. For those children whose performance deteriorates and doesn't recover after continued memory searches (as when you "block" on names after needing to introduce too many people, or your handwriting and spelling deteriorate at the end of a long essay exam), short practice periods are best (Farnham-Diggory & Gregg, 1975; Lehman & Brody, 1982; Wozniak, 1972). There needs to be a willingness to discontinue practice when performance begins to decline rather than encouraging the child to "play it until it's perfect." It's that kind of one more time reasoning that results in the skier's broken leg and the piano student's decline in satisfaction and motivation. Concentration can only be pushed so far.

13. Avoid Perceptual Overloading.

As children with learning problems often rely exclusively on the perceptual characteristics of materials instead of using their past knowledge to problem solve, perceptual overloading can disturb the ability to recall or reason about material that has already been mastered (Reid, 1980). This can occur by presenting too much information for review at once (Bryant & Gettinger, 1981) or by presenting materials that contain inherent distractors (Radosh & Gittleman, 1981). Therefore, it is important to give children fewer bits of material to look at or listen to at once if they are distracted or overloaded by the perceptual features of the music. For example, the same 12 measures of musical notation can be spread over three pages, with four measures per page. The optimum unit size for each pupil needs to be determined by the teacher, so that material is limited accordingly. Irrelevant drawings, instructions, and diagrams on music sheets need to be minimized as these frequently act as distractors.

14. Teach Self-Verbalization as a Learning Strategy.

Children's memory abilities are strongly tied to their use of language to label what they have seen (Drew & Altman, 1970; Luria, 1977; Meichenbaum, 1976, 1977; Miller, Shelton, & Flavell, 1970; Tarnopol & Tarnopol, 1977; Torgesen & Goldman, 1977). These labels help to organize, store, rehearse, and recall the visual information (Bandura, Grusec, & Menlove, 1966; Flavell & Wellman, 1976; Garrity, 1975; Jensen, 1971; Kohlberg, Yarger, & Hjertholm, 1968; Sheingold &

Shapiro, 1976; Weithorn & Kagen, 1979; Wozniak, 1972). Yet children with learning difficulties often do not automatically use speech to guide their behavior or as a mediator for thought.

In order to help students learn to use self-verbalization to guide and sustain appropriate attention and motor movements, a teacher might count or name notes aloud and have students count or name along. Next the teacher's counting or naming could be faded and the students would count or name alone. This technique is also useful when naming shapes of notes, colors of notes, rests, etc. so as to draw attention to appropriate sequences of stimuli.

15. Enhance Motivation by Use of Individualized Incentives.

Handicapped students' performance is often diminished by low motivation and holding outside factors rather than personal effort responsible for success and failure (Adelman & Chaney, 1982; Paris & Haywood, 1973). As these children often blame their failure on external factors or on their own inferiority, they find it safer to expect little, not put effort into learning, and be helpless (Dweck, 1975). Extrinsic incentives can help children who avoid challenges to put more effort into learning. Therefore, it is important to build into our lessons immediate concrete rewards for performance: point systems; charting; special rewards if all music students achieve a particular goal that week; contracting, in which youngsters make their own decisions about what to achieve and what the pay-off will be. Of course, these rewards are always accompanied by praise which, when internalized, helps children build intrinsic motivation. External

reinforcement also can come from materials and activities that are highly motivating, such as substituting a concert in the park for a lesson, playing the musical piece on bottles of water, pounding the rhythm on a drum, etc.

Sharing the child's successes with his or her parents is essential, as the best teacher of internal motivation is the child's family. Children model their own families' striving for success and the kind of feedback given to children often helps them reverse their learned helpless attitudes. Both parents and teachers need to help children attribute failure to something other than external sources and their own self-worth, so that they may regain their interest, enthusiasm and motivation to put energy into learning. Attributing children's successes and failures to amount of effort put into learning, rather than giving general praise or reproofs ("good try at reading the music" vs. "you're great") results in internalized "I am capable" messages. Since these children do not believe they are capable general praise means little. Praising effort reduces self-criticism and shifts attention to what can be done to achieve. The goal is to increase a child's orientation toward doing one's best, which then increases success and leads to a gradual shift back to self-attributions for improvement (Bandura, Jeffrey, & Gajdos, 1975).

16. Involve Parents.

Learning is best facilitated when parents are an integral part of the educational effort (Bronfenbrenner, 1975). Therefore, parents should attend all music lessons and be encouraged to practice daily

with their children.

Methods

Subjects

In order to pilot application of the teaching principles enumerated above to the task of mastering musical notation, three students were selected. All three students had completed 1 - 1 1/2 years of weekly Suzuki piano instruction. All had achieved success with the aural Suzuki techniques as demonstrated by mastery of pieces in Volume 1 of the Suzuki curriculum. All were at a level of Suzuki proficiency equivalent to that of youngsters typically ready to transition to reading musical notation. This transition was advisable in order for the music to serve as a referance point and memory aid when mastering more complex Suzuki pieces. However, after one-half year or more of weekly instruction with traditional note reading material, these students showed little mastery within these programs and no sight recognition of notes presented out of their original contexts.

The students included two learning disabled girls, aged nine and thirteen, and one six year old educable mentally handicapped boy. The nine year student was well developed physically, athletic, and socially well-adjusted. Her learning disability was specific to reading. She had been introduced to piano at age seven and acquired the Suzuki piano pieces rapidly "by ear." After 1 1/2 years of instruction, she had mastered all the pieces in Suzuki Volume 1 with both hands, playing

very musically. Progress halted when it was time to transition to reading musical notation. Six months of instruction with the beginning volume of a traditional music program resulted in minimal sight reading ability.

The thirteen year old student, who had learning disabilities in reading and math, made very slow progress from ages nine - twelve with a "traditional" piano instructor. The process of completing three volumes of traditional materials was characterized by a high error rate and only partial mastery. She still could play no pieces from memory and could not recognize the same notes she had been reading in her music books when presented when presented in a new context. Piano being her "special thing," this slow progress only exacerbated the student's low self-image. Subsequent aural Suzuki instruction for 15 months resulted in a large repetoire of memorized melodies and great confidence in group performance. She mastered all of Suzuki Volume 1 with her right hand and nine pieces with hands together.

The six year old youngster was functioning in most areas at a high educable mentally handicapped level. His mother being a Suzuki teacher, he had been exposed to music since birth. His confidence grew as he mastered several Suzuki pieces aurally during the first year of instruction. However, he too could not learn to read music notation at a time when children with similar music ability typically are ready to make the transition.

Procedure

All three children attended private weekly piano lessons. The nine year old received 30 minute lessons and the thirteen year old participated for 45 minutes. The six year old's attention span limited lessons to 15 minutes. The students were instructed with three volumes of music material specifically designed to reflect the teaching principles discussed earlier. In contrast to traditional techniques, the experimental "Shapes and Sounds" materials used notes in the form of shapes to eliminate the need for line-space notes, directional, and interval discrimination. The materials delayed playing hands together, eliminated multiple 5-finger positions, increased the frequency of reinforcement and review, enlarged note and staff size, limited quantity of notes and measures per page, taught rhythm and note recognition separately, used aural and motor reinforcement strategies, and reduced distractions on the music page (Mofson, S. Shapes and Sounds: A Unique Approach to Reading Piano Music. Syracuse, N.Y., 1985).

Our developmentally delayed students' failure with traditional music materials and methods suggested that the strategies had been mismatched with these children's unique patterns of abilities and learning styles. They made demands of the children that they were not yet ready to meet. Consequently, the guiding principle in preparing the music materials and individualizing reinforcement activities was the developmentalist view that handicapped children may be quantitatvely behind their peers in learning ability, but that their learning processes are nevertheless qualitatively similar to those typical in earlier development (Smith, 1983). There attention, visual,

motor, and language processing abilities lie along a predictable, orderly continuum of development, albeit at a lower level than would be expected for their ages. Consequently, these children could be instructed in much the same as we would instruct younger typical learners.

Results

The children received 20 (six year old), 32 (nine year old), and 60 (thirteen year old) weeks of piano instruction with the "Shapes and Sounds" materials, accompanied by individualized reinforcement activities. A new note was introduced every six melodies. All children mastered each melody with only occasional errors. At the conclusion of the pilot period, the six year old little boy could recognize middle C in both familiar and novel materials, and he had mastered D and E in shape form. The nine year old girl completed Volume 1 of the program and 36 melodies in Volume 2. She could recognize C, E, and G in the treble and base clefs in both familiar and novel materials and was able to read D and F in shape form with both hands. The 13 year old student made similar progress, but had not yet faded G from its shape form. Interestingly, because she moved to another community, the nine year old student provided an unplanned multiple baseline measure. For 14 months she continued piano instruction in her new location with traditional materials. As might have been predicted, she encountered great frustration and made minimal progress. She then quit piano.

Discussion

This project was designed to be a preliminary investigation of the adaptibility of special educational techniques to teaching note reading to hard to teach students. The materials and methods generated by the 16 principles enumerated above were successful in facilitating note reading for two learning disabled girls and one educable mentally handicapped boy. All had progressed well with the aural Suzuki methods, but were unable to use traditional teaching materials and methods to transition to reading music, even with prolonged repetition. With their progress halted, their frustration mounted and self-esteem declined. Three volumes of music reading materials and special reinforcement activities were developed incorporating the 16 teaching principles gleaned from our psychological and educational literature. After working in these volumes, all students were able to learn to recognize notes in shape form in a nearly errorless fashion and they maintained recognition as the shapes were faded over time. More importantly, all students were able to sight read the faded notes in novel music pieces with no difficulty.

A second purpose of this project was to explore the position that music educators represent an important vehicle in the normalization of handicapped children's life experiences. Clearly, psychological and educational research knowledge can be generalized beyond the classroom to enhance children's learning opportunities in areas of achievement generally limited to typical learners, such as instrumental instruction. Besides the satisfaction generated by their success, our students benefitted in such areas of weakness as difficulty with sustained attention, finger dexterity, sequencing, auditory perception

and memory, visual perception and memory, coordination of left and right hand movements, auditory-visual integration, and eye-hand coordination. Although it is not being suggested that gains in these areas will transfer beyond the piano to any other type of lessons (e.g. reading, math), these gains nevertheless may enhance the child's and parents' expectations for achievement in other areas as well. As importantly, these newly acquired skills may be able to help developmentally disabled individuals use their leisure time more effectively, diminish social isolation, and integrate with our culture's aesthetic experiences. It is important for music educators to take responsibility for merging theory with unique intervention ideas so as to open to handicapped youngsters important vehicles for personal expression, social communication, and enhancement of self-esteem. This preliminary work demonstrates that this can be done.

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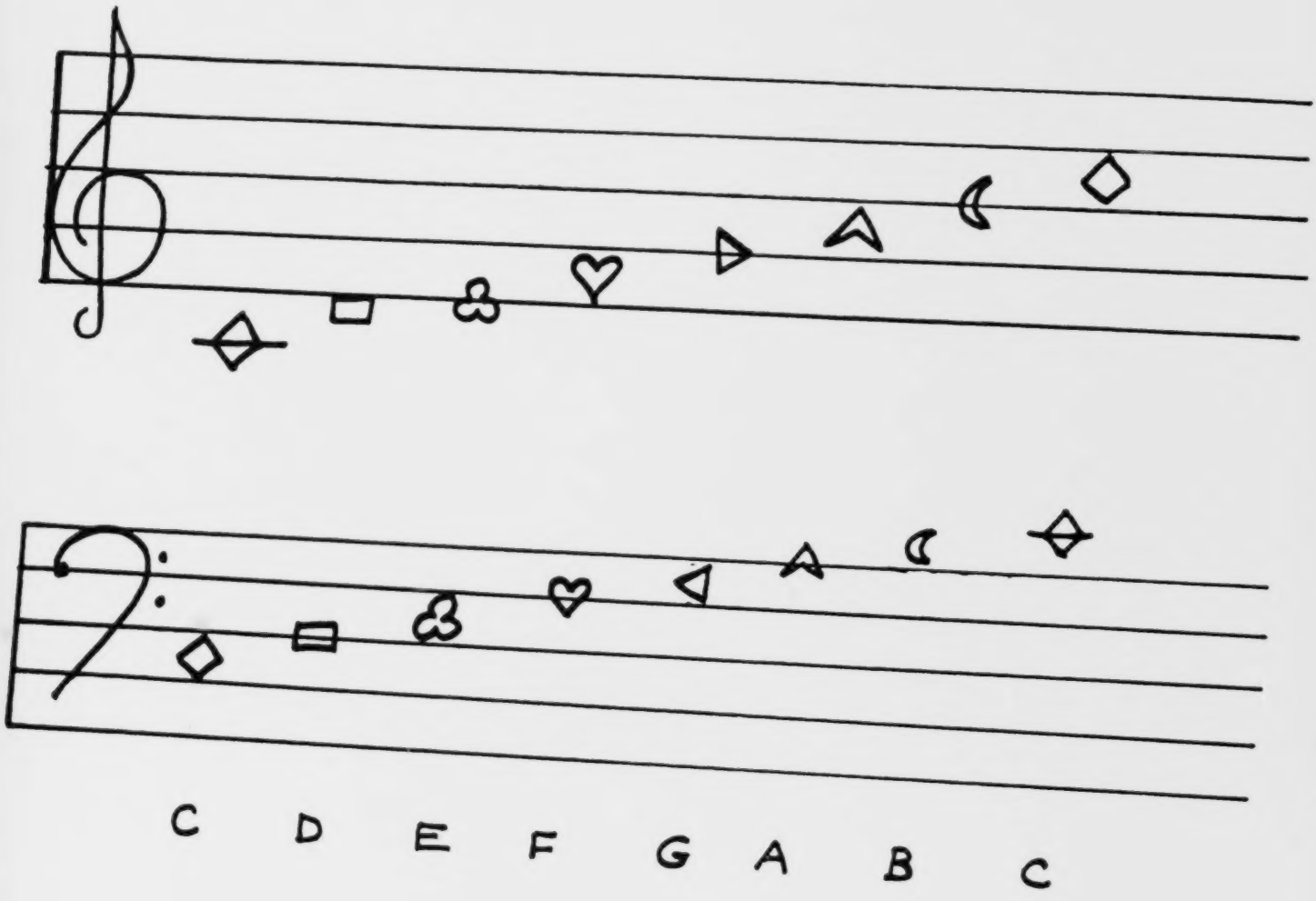

Fig. 1

REPLACING NOTES WITH SHAPES

Mofson, S. Shapes and Sounds: A Unique Approach to Reading Piano Music. Syracuse, New York: 1984.
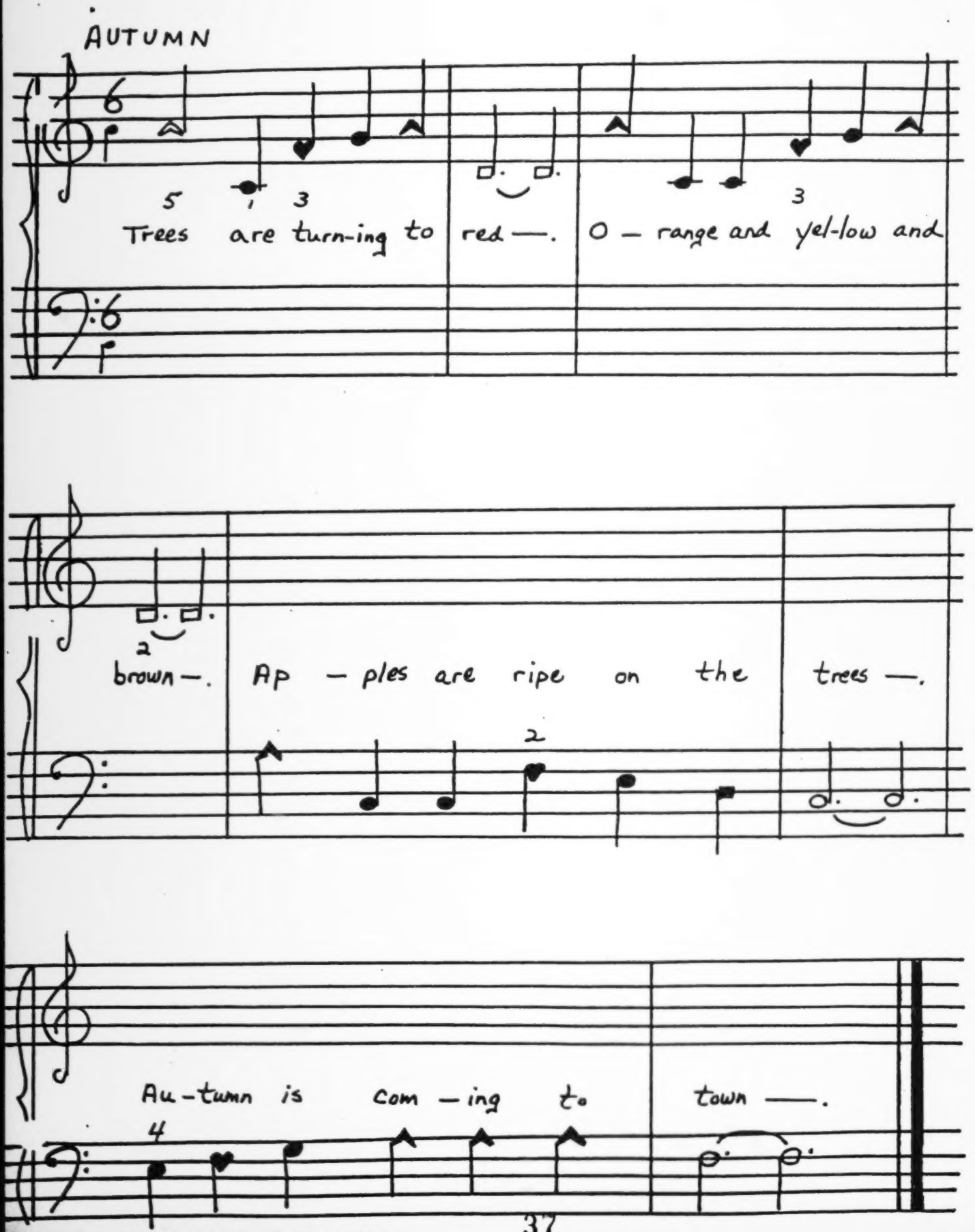
Figure 2. Fading shapes of line notes.
Mafson, S. Shapes and Sounds: A Unique Approach to Reading Piano Music. Syracuse, N.Y.: 1984,p.44.

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Adapting Piano Instruction to the Needs of Children w. LD – Merging Research + Intervention

Piano Instruction for the Student with Special Educational Needs: A Position Paper and Preliminary Study

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